Application No.: 09/316549   Docket No.: PAS-093RCE

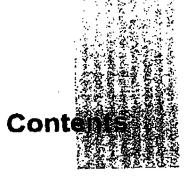# APPENDIX

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Pro/ENGINEER®

Behavioral Modeling
Task Guide

Parametric Technology Corporation

APPENDIX 1

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About This Guide

About This Guide describes the conventions used in this guide,
resources and services of Parametric Technology Corporation®
(PTC™), and ways you can give PTC feedback on documentation.

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Book Conventions

The following table illustrates and explains conventions used in writing about Pro/ENGINEER and Behavioral Modeling.

Convention	Description
Boldface	Windows-type menu name, or menu or dialog box option (for example, **View**), or utility (for example, **ptcstatus**).
Monospace (Courier)	Directory and file names, keyboard input, parameters, equations, and system messages appear in `courier font like this`.
Monospace (Courier) within less-than and greater-than symbols (<>)	Variables (for example, `output=<verbosity>`).

Resources and Services

For resources and services to help you with Parametric Technology Corporation (PTC) software products, see the PTC Customer Service Guide. It includes instructions for using the World Wide Web for customer support.

Documentation Comments

PTC welcomes your suggestions and comments. You can send feedback in the following ways:

- Send comments electronically to doc-webhelp@ptc.com.

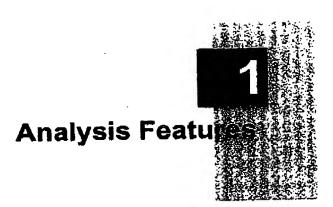- Fill out and mail the PTC Documentation Survey located in the *PTC Customer Service Guide.*

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Analysis Features

Behavioral Modeling, introduced in Pro/ENGINEER 2000i, gives you the tools you need to design product models that are driven by your requirements and specifications.

In traditional design systems, you need to manually iterate the geometry of designs. You hope to get close to your objective, but you are not always able to identify solutions. Instead of settling on a design estimate that is "close enough," now you can explore optimal solutions with a complete understanding of the performance and behavior of the design.

This new way of identifying solutions with Behavioral Modeling is achieved through the use of analysis features, which are described in this chapter.

Analysis Features

An analysis feature is a regular Pro/ENGINEER® datum feature. The analysis feature may contain a regular Pro/ENGINEER analysis, a user-defined analysis, or a feature relation. The result of an analysis feature is a set that includes an unmodifiable feature parameter and datum features, such as a datum points, coordinate systems, or graphs.

An analysis feature consists of one or more parameters or datums (or both) that depend on an analysis performed on the model. Analysis features can be of the following t:

- Measurement
- Model Analysis
- Curve Analysis
- Surface Analysis
- Relations
- User-Defined (UDA)
- External (accessible through Pro/TOOLKIT)

The analysis feature and any dependent features update automatically when changes are made in the design.

With the analysis feature, you can capture design goals directly in the Pro/ENGINEER model. You can assess the impact of changing design variables on design goals with sensitivity studies. The analysis feature also creates the foundation for automating selection of appropriate values for design variables to meet design goals using feasibility and optimization studies.

You can now save any analysis and make its display permanent, or persistent. If you turn on the display of a saved curve analysis, surface analysis, or UDA, the analysis display updates when the model is modified. To turn the display on, click Save or View > On in the Analysis Creation dialog box. The persistent display provides immediate visual feedback on the impact of change on a design objective.

Analysis features are one of the new smart-model features in Behavioral Modeling. Analysis features are also an important link between the geometric measurement and analysis functionality of

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Pro/ENGINEER and the objective-driven design functionality of
Behavioral Modeling. Analysis features allow you to measure
geometric properties of the model at specific points in the list of
features or components of the model.

Through analysis features these measurements produce parameters
and logical datums that you can use to determine geometric
properties such as mass, volume, curvature, the center of gravity, and
many others. You can even create your own parameters as the result
of a relation or a user-defined analysis. Analysis features are
required elements of the other objective-driven Behavioral Modeling
tools: user-defined analysis, sensitivity analysis, and feasibility and
optimization studies.

Note that analysis features are like any other model features in that
their place in the feature order affects the resultant parameters. For
example, consider the case of a cube of material that is shelled to
create a container. There exists no current analysis method for
determining the holding capacity of the container, but there are
measurements that can determine the solid volume of the model.
With Behavioral Modeling you can use these measurements in
analysis features to determine the capacity of the container.

One way to perform this measurement is to first create an analysis
feature that measures the solid volume after the cube is created.
Then create another analysis feature that measures the solid volume
after the cube is shelled. Finally, create an analysis feature (a
relation) that finds the difference between the two solid-volume
measurements. The parameter that results from this analysis feature
is the holding capacity of the container.

By placing analysis features at strategic points in the feature or
component list, you can track changes in the geometric properties of
the model. You can obtain valuable geometric model information as
the feature list grows or changes.

The basic steps in creating an analysis feature are as follows:

1. Click **Create > Datum > Analysis.** The Pro/ENGINEER 2000i
   Option Driven User Interface (ODUI) appears. The system
   prompts you to enter a new name for the analysis feature or to
   accept the default name.

2. Select one of the following analysis types:

   — **Measure**

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Analysis Features

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- — Model Analysis
- — Curve Analysis
- — Surface Analysis
- — Relations
- — User-Defined Analysis

3. Perform the selected analysis.

4. Select the parameters to be created as feature parameters of the analysis feature.

5. Select the datums to be created at logical positions in the analysis.

Measure

This section presents the capabilities and applications of analysis features of type Measure. It also includes procedures for creating these features and scenarios in which you can apply this analysis feature.

The following table is a quick reference that lists all possible permutations of the Measure type of analysis feature. If you have access to the Behavioral Modeling Extension (BMX) to Pro/ENGINEER 2000i software, you can create analysis features using every available measure analysis option in Pro/ENGINEER except the transformation measure. Each type of measure analysis feature can output a set of parameters and datums. These feature parameters and datums have default names that you can change. The feature parameters and datums are special because they receive their values from measurements and therefore cannot be modified elsewhere in Pro/ENGINEER. As expected, these parameters and datums can be used in downstream design and modeling.

Definition	Default Parameters	Description of Parameters	Default Datums	Description of Datums
Curve Length	LENGTH	Length of curve/edge/chain	N/A	
Distance	DISTANCE	Distance between selected entities	PNT_FROM_entid	Datum point created on from entity

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